

# Monkeypox Virus

(MPX)

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# Background and Epidemiology

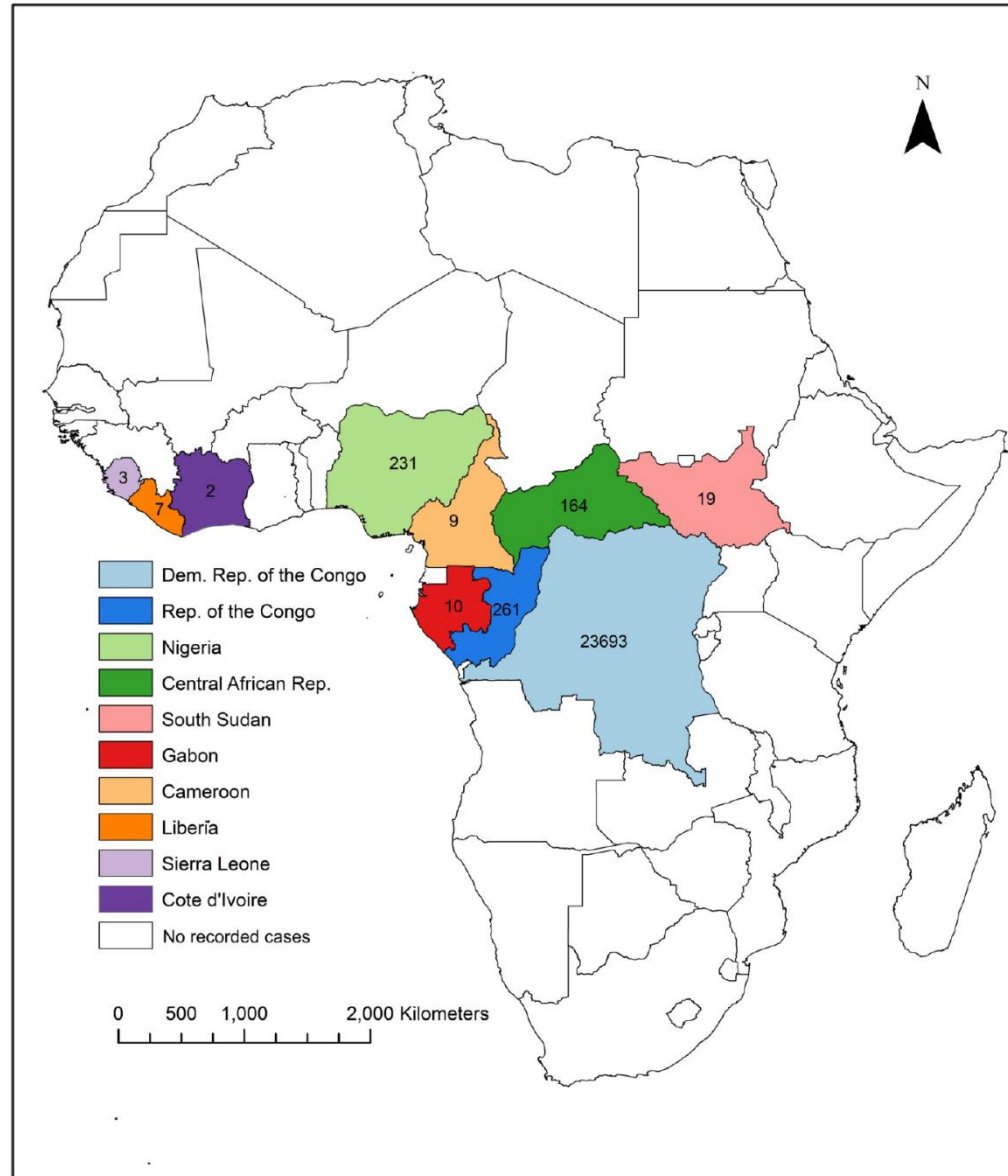
# Sources of Monkeypox Data

- [World Health Organization](#)
- [European Centre for Disease Prevention and Control](#)
- [UK Health Security Agency](#) (UKHSA)
- [U.S. Centers for Disease Control and Prevention](#)
- [Our World in Data](#)
- Individual journal articles/publications

# Background

- Family: *Poxviridae*
- Genus: *Orthopoxvirus* (which includes the variola virus that causes smallpox)
- First discovered in 1958 after two outbreaks in colonies of research monkeys (hence the name “monkeypox”)
- First human case recorded in 1970 in the Democratic Republic of Congo (DRC)
- Endemic in parts of Africa (e.g., west African nations and DRC)
- Natural reservoir is believed to be rodents

# African Monkeypox Cases, 1970-2018



# Current Global Monkeypox Outbreak Cases



Data as of 08 Jun 2022 5:00 PM EDT

Total Confirmed Cases	Number of Countries
1200	29

Country	Total Confirmed Cases
United Kingdom	321
Spain	198
Portugal	191
Germany	113
Canada	100
France	66
Netherlands	54
United States	39
Belgium	24
Italy	20
United Arab Emirates	13
Switzerland	12
Ireland	7
Australia	6
Czechia	6
Slovenia	6
Sweden	5
Denmark	3
Israel	3
Argentina	2
<b>Total</b>	<b>1200</b>

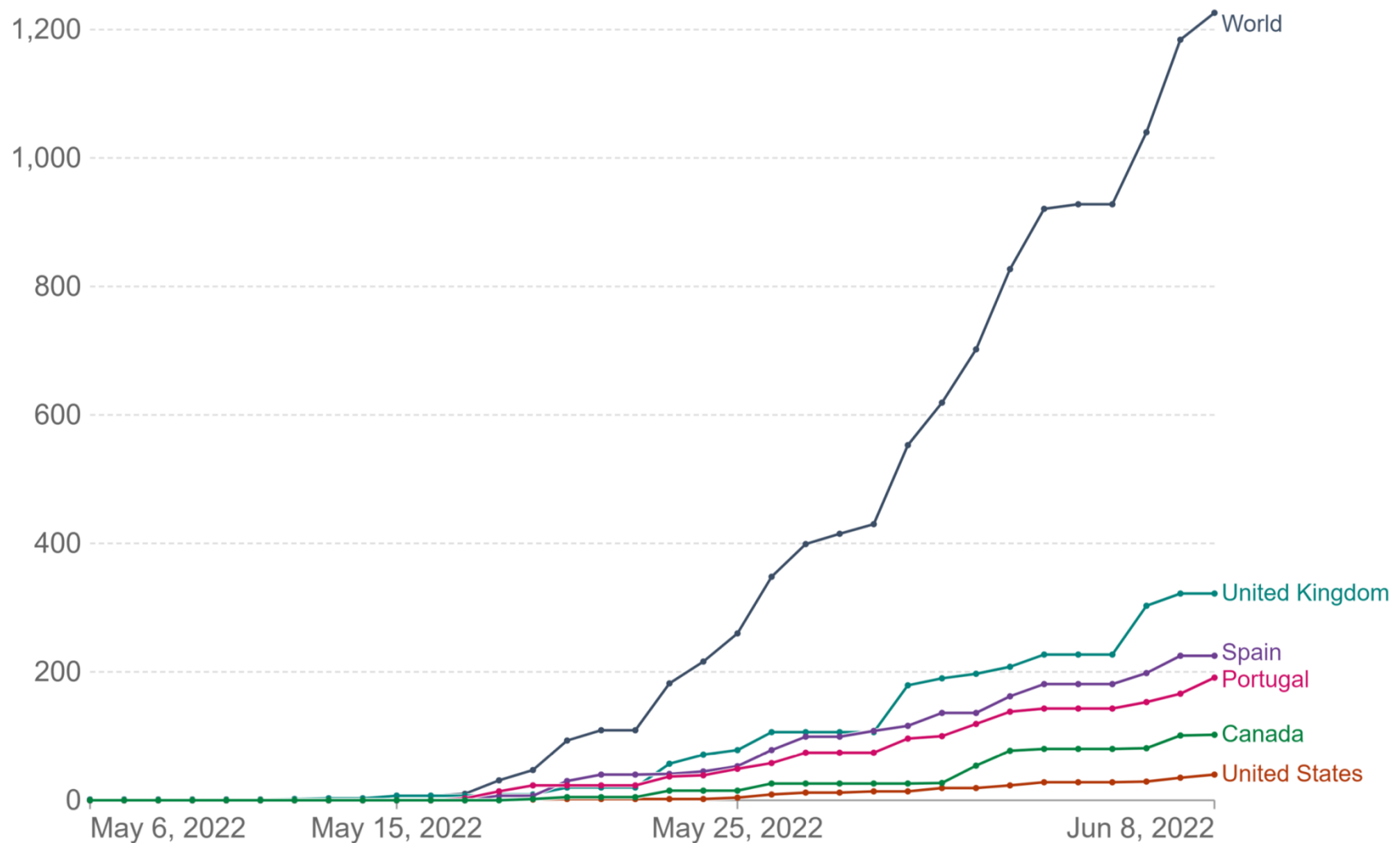
**Notes:** Numbers shown are sourced from publicly available official sources, such as the WHO, European CDC, US CDC, and Ministries of Health. Data are provided for situational awareness only and are subject to change. Confirmed cases include those confirmed as monkeypox virus and may include cases only confirmed as orthopoxvirus.

<https://www.cdc.gov/poxvirus/monkeypox/response/2022/world-map.html>

# Monkeypox: Cumulative confirmed cases, by date of confirmation

Cases are shown by the date on which they were confirmed by a test.

Our World  
in Data

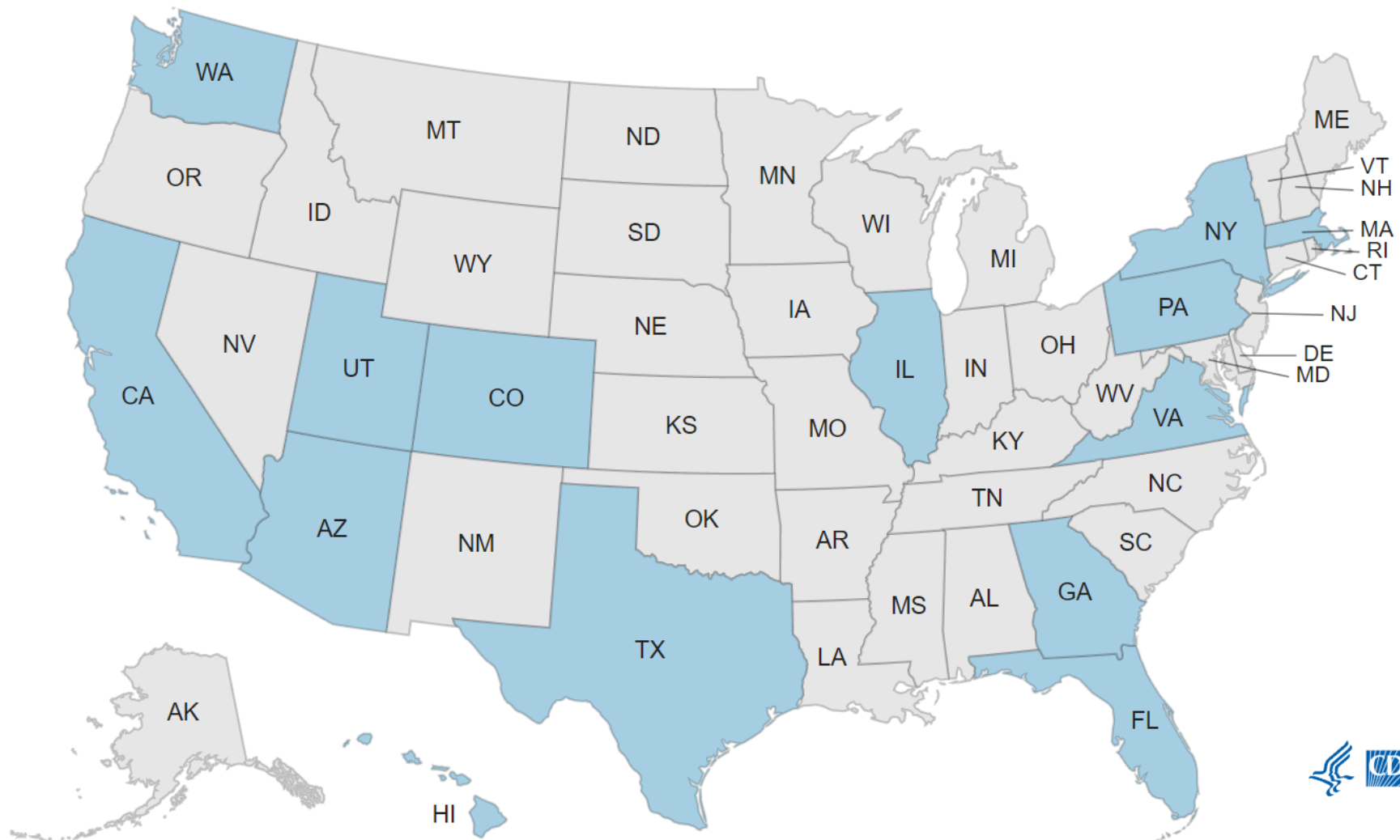


Source: Data produced by the 'Global.health' team — available at [github.com/globaldothealth/monkeypox](https://github.com/globaldothealth/monkeypox)

CC BY

<https://ourworldindata.org/monkeypox>

# Monkeypox and Orthopoxvirus Cases in the U.S.\*



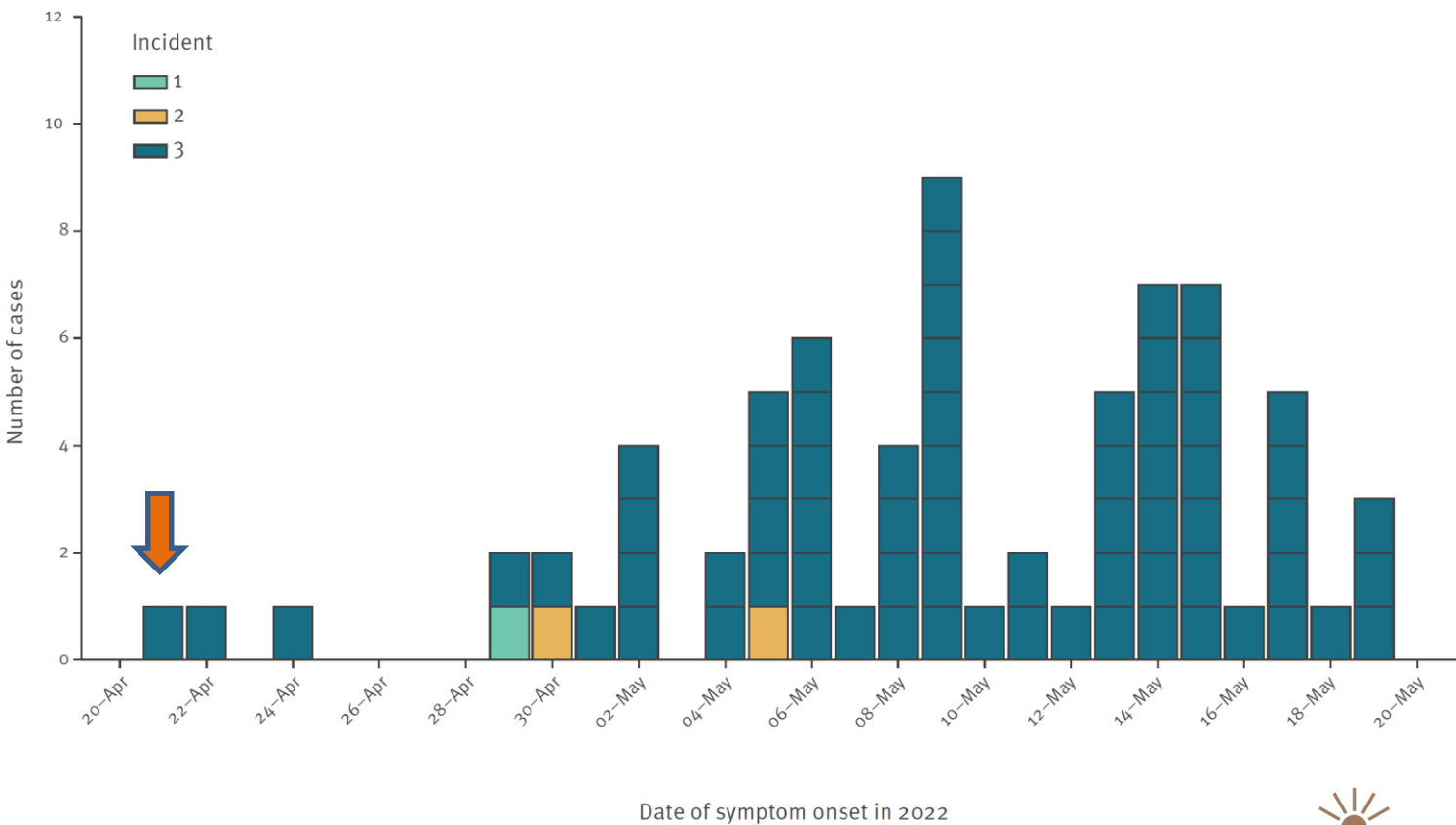


# Community transmission of monkeypox in the United Kingdom, April to May 2022

- Incident 1: Single isolated case imported from Nigeria
  - 116 contacts identified (including HCWs), none developed MPX
- Incident 2: Household cluster (2 cases)
  - No travel link and no source of infection identified
  - 98 contacts identified (including HCWs), none developed MPX
- Incident 3: Community transmission (82 cases)
  - All males
  - Median age 38 years (IQR: 32-43 years)
  - 18 reported foreign travel to multiple countries outside Africa
  - 83% identified as gay, bisexual, or men who have sex with men (MSM)
  - Sexual histories: identified links to sex parties and use of dating apps both in the UK and abroad suggesting transmission in sexual networks
  - 356 community (non-hospital) contacts identified (23%household, 22% sexual, 25% friend/shared space, 23% workplace, 7% community healthcare)

# Community transmission of monkeypox in the United Kingdom, April to May 2022

**FIGURE**  
Distribution of laboratory-confirmed monkeypox cases, by symptom onset date and associated incident, United Kingdom, 20 April–25 May (n = 72 with known onset dates)



# Community transmission of monkeypox in the United Kingdom, April to May 2022

TABLE

Description of assessed close contacts of monkeypox cases according to their origin, risk category, and management, United Kingdom, up to 24 May 2022 (n = 588)<sup>a</sup>

Contact type	Low risk Number	Medium risk Number	High risk Number	Total medium and high risk Number	Vaccinated among medium and high risk Number (%)
Community <sup>b</sup>	97	70	37	107	15 (14)
Healthcare <sup>c</sup>	139	197	48	245	169 (69)

NHS: National Health Service.

<sup>a</sup> Close contacts assigned a risk category up to 24 May 2022.

<sup>b</sup> Community contacts include household, travel, workplace, shared space and community healthcare contacts.

<sup>c</sup> Healthcare contacts include healthcare workers in eight NHS hospitals.

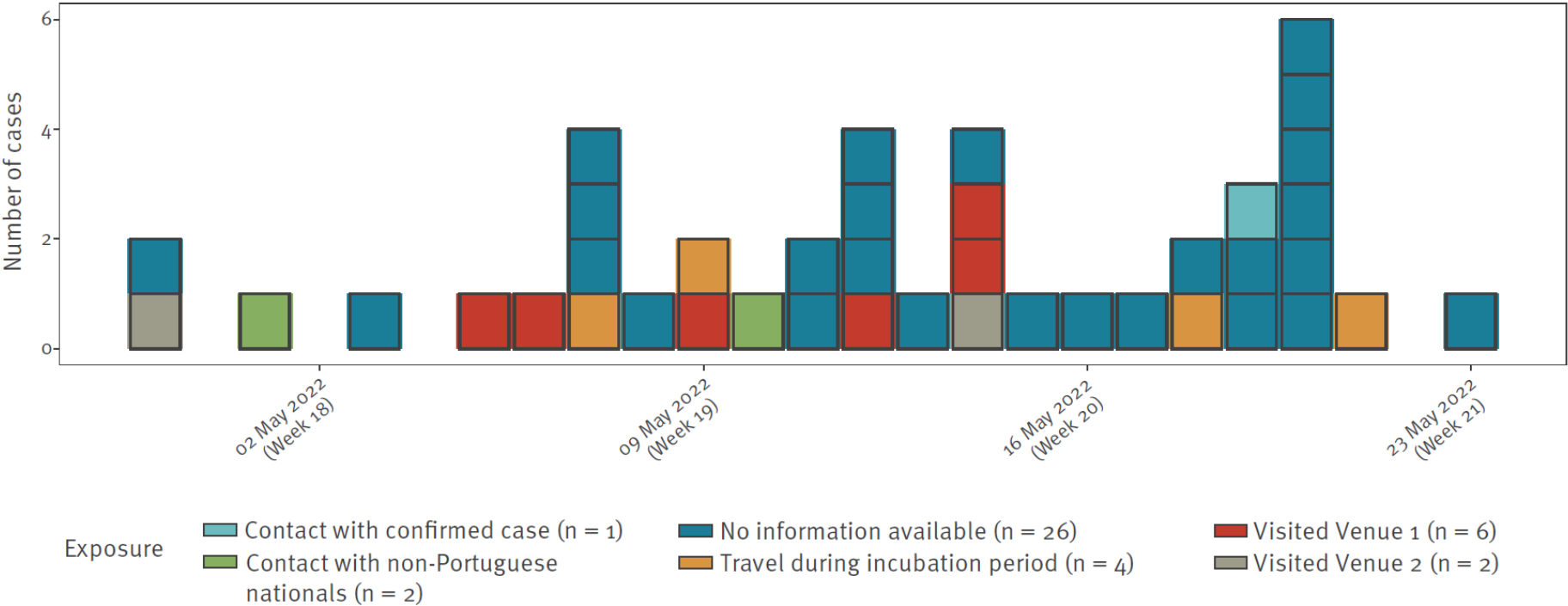
# Ongoing monkeypox virus outbreak, Portugal, 29 April to 23 May 2022

- Study reports preliminary findings from 27 cases in Portugal
  - All male
  - Median age 33 years (range from 22-51 years)
  - “Almost all” identified as MSM (one person reported having sex with only women)
  - Most (14 out of 16 persons with data) reported sex with multiple partners
  - Most common symptoms: rash (n=14), inguinal lymphadenopathy (n=14), fever (n=13), genital ulcers (n=6)
  - No deaths
- Skin lesions started in the perianal and genital areas in some patients
- Exposures: saunas used for sexual encounters and/or travel abroad
- Earliest symptom onset: April 29<sup>th</sup>

# Ongoing monkeypox virus outbreak, Portugal, 29 April to 23 May 2022

FIGURE

Confirmed monkeypox cases by date of symptom onset and exposure, Portugal, 29 April–23 May 2022 (n = 41<sup>a</sup>)



## Monkeypox Outbreak — Nine States, May 2022

- First 17 cases of Monkeypox identified in the U.S. (from 9 states)
  - Average age: 40 years (range 28-61 years)
  - Most (16, or 94%) identified as gay, bisexual, or MSM
  - 14 (82%) reported international travel involving 11 different countries
- Contact investigation on 13 patients (see CDC's [risk classification](#)):
  - 56 High risk
  - 117 Intermediate risk
  - 235 Low/Uncertain risk
- 8 persons (47%) had an atypical presentation
  - lesions began in the genital or perianal regions
  - No fever or prodromal symptoms before rash onset

**TABLE 2. Clinical characteristics of patients with confirmed orthopoxvirus and monkeypox (N = 17) — United States, May 2022\***

Characteristic	No. (%)		
	At illness onset	Prodromal period <sup>†</sup>	At any point in illness
<b>Signs and symptoms<sup>§</sup> during illness</b>			
Rash	5 (29)	NA	17 (100)
Fatigue or malaise	3 (18)	13 (76)	13 (76)
Chills	0 (—)	4 (24)	12 (71)
Lymphadenopathy	0 (—)	1 (6)	9 (53)
Inguinal	0 (—)	0 (—)	6 (35)
Cervical <sup>¶</sup>	0 (—)	1 (6)	3 (18)
Headache	2 (12)	5 (29)	8 (47)
Fever	6 (35)	5 (29)	7 (41)
Body ache	1 (6)	2 (12)	6 (35)
Sore throat or cough	2 (12)	3 (18)	5 (29)
Sweat	1 (6)	2 (12)	4 (24)
Other	3 (18)	4 (24)	13 (76)
<b>Rash locations<sup>§</sup></b>			
Arm	4 (24)	NA	9 (53)
Trunk	1 (6)	NA	9 (53)
Leg	0 (—)	NA	8 (47)
Face	2 (12)	NA	7 (41)
Hand	1 (6)	NA	6 (35)
Perianal	5 (29)	NA	6 (35)
Oral	0 (—)	NA	5 (29)
Neck	1 (6)	NA	5 (29)
Genital (penis or vagina)	4 (24)	NA	4 (24)
Feet	1 (6)	NA	4 (24)

# Summary

- Case counts are increasing in the U.S. and globally with evidence of community transmission occurring largely through sexual networks
- The current MPX outbreaks are predominantly affecting younger males (ages 20-40 years) who identify as gay, bisexual, or MSM
- Signs/symptoms can be atypical:
  - Rash or skin lesions beginning in the genital or perianal regions
  - Skin lesions without a fever or other prodromal symptoms first
- Presenting with mild disease (no reported deaths so far)
- Despite multiple healthcare contacts, this infection is NOT easily transmitted without close prolonged face-to-face or physical contact



# Clinical Characteristics

# Symptoms

- Incubation period on average is 7-14 days (range: 5-21 days)
  - A person is NOT contagious during their incubation period
- Initial symptoms (prodromal period): fever/chills, malaise, headache, sore throat, cough, and localized or generalized lymphadenopathy
  - A person MAY be contagious during the this period
- Rash appears ~1-3 days after initial symptoms and progresses through 4 stages (macular > papular > vesicular > pustular) before scabbing and crusting over
  - A person IS contagious from the onset of the rash through the scab stage
  - Typical rash progresses from mouth > face > arms/legs > hands/feet (including palms/soles); however, this is NOT the situation with many cases currently
- Once all skin lesions have scab over and scabs have fallen off, a person is no longer considered infectious
- Illness resolves within 2-4 weeks

# Key Characteristics for Identifying Monkeypox



- Lesions are well circumscribed, deep seated, and often develop umbilication (resembles a dot on the top of the lesion)
- Lesions are relatively the same size and same stage of development on a single site of the body (ex: pustules on face or vesicles on legs)
- Fever before rash
- Lymphadenopathy common
- Disseminated rash is centrifugal (more lesions on extremities, face)
- Lesions on palms, soles
- Lesions are often described as painful until the healing phase when they become itchy (crusts)

# Monkeypox Skin Lesions



<https://www.cdc.gov/poxvirus/monkeypox/response/2022/index.html>  
[https://emergency.cdc.gov/coca/ppt/2022/052422\\_slides.pdf](https://emergency.cdc.gov/coca/ppt/2022/052422_slides.pdf)  
<https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2022.27.22.2200421>  
<https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2022.27.22.2200411>

# Human-to-Human Transmission

- Exposure occurs through broken skin, the respiratory tract, or mucous membranes, which requires:
  - Close prolonged face-to-face contact through spread of large respiratory droplets
  - Direct physical contact with infectious body fluids or lesion material
  - Indirect physical contact with infectious lesion material/fluids (e.g., clothing or linens)
- Monkeypox is not considered a sexually transmitted infection
  - Spread occurs between sexual partners through physical contact
  - It remains possible that there could be a “genital reservoir” (e.g., testes) for monkeypox, but this needs further study



# Clinical features and management of human monkeypox: a retrospective observational study in the UK

- Case-series of 7 patients diagnosed with monkeypox in the UK from 2018-2021
- Patient #4:
  - Had sexual intercourse appropriately 6 weeks post-hospital discharge resulting in increasing lymphadenopathy and new localized pustular and ulcerating skin lesions
  - PCR of skin lesions AND upper respiratory tract swabs were newly positive
- *“The temporal association between sexual intercourse, increased inguinal lymphadenopathy, and recurrence of rash could suggest a genital reservoir of monkeypox virus, as has been reported with many other emerging viruses.”*

# Epidemiological, clinical and virological characteristics of four cases of monkeypox support transmission through sexual contact, Italy, May 2022

TABLE 2

Timeline of PCR results, monkeypox cases, Italy, May 2022 (n = 4)

Day after symptom onset	Patient 1		Patient 2			Patient 3				Patient 4
	Day 5	Day 9	Day 3	Day 5	Day 9	Day 5	Day 6	Day 8	Day 11	Day 4
Serum	Pos (29.7)	NA	AO	AO	NA	AO	AO	NA	NA	AO
Plasma	Pos (30.2)	NA	AO	AO	NA	NA	AO	NA	NA	AO
Genital or rectal lesions	Pos (15.6)	NA	Pos (17.5)	AO	NA	Pos (15.3)	NA	NA	NA	Pos (14.7)
Nasopharyngeal swab	Pos (27.6)	AO	Pos (30.2)	NA	NA	NA	AO	NA	NA	Pos (30.4)
Skin lesions	NA	NA	Pos (30.4)	AO	NA	Pos (18.2)	Pos (19.4)	NA	NA	Pos (17.6)
Seminal fluid	NA	Pos (30.1)	NA	Pos (29.4)	Pos (43.2)	NA	Pos (29.3)	Pos (27.7)	Neg	NA
Scab	Pos (13.1)	NA	NA	NA	NA	Pos (20.0)	NA	NA	NA	NA
Faeces	NA	NA	Pos (22.6)	NA	NA	NA	Pos (26.1)	NA	NA	NA
Saliva	NA	NA	Pos (27.1)	NA	NA	NA	AO	NA	NA	NA

# Persons Recommended for Testing

- Any person with new skin lesions [consistent with monkeypox](#) if the skin lesions occurred:
  - Within a few weeks after traveling to another country where monkeypox is being reported
  - After close/physical contact to a person with a similar rash or skin lesions, or who is suspected or confirmed to have monkeypox
  - After intimate physical or sexual contact with a partner, especially in men who have sex with men (MSM), or after any intimate/sexual contact that occurred during travel
- NH DPHS will also consider testing persons who do NOT have risk factors, but DO have characteristic monkeypox skin lesions
- See initial [monkeypox HAN](#) (5/20) for testing instructions



# Request of Providers

- When evaluating patients for monkeypox infection:
  - Place patient in a private room with a private bathroom (airborne isolation is not required unless conducting an aerosol generating procedure)
  - Wear recommended PPE (see CDC's [infection prevention guidance](#))
  - Take a detailed sexual history
  - Ask about travel
  - Ask about any close or physical contact to a person who may have had similar skin lesions
  - Take a detailed history of the skin rash/lesions and any other symptoms
- If evaluating a patient for perianal/genital lesions, also screen for other STIs given high risk of concurrent infection (see [The Lancet Preprint](#))
- Report suspected cases of monkeypox to NH DPHS at 603-271-4496 (nights and weekends call 603-271-5300 and ask for the on-call public health nurse)

# Report Information about Skin Lesions

- Onset date
- Progression over time
- Body parts/regions affected
- Number and size of skin lesions
- Describe skin lesions in commonly used medical terminology (e.g., macules, papules, vesicles, pustules)
- Describe other associated symptoms or skin lesion characteristics (e.g., painful, itchy)
- Consider taking an anonymous picture of skin lesions
- Use available monkeypox resources and pictures to evaluate for similarity

# Public Health Response to Monkeypox

- Case Investigation
- Initiate appropriate specimen collection & submission for testing
  - *Orthopoxvirus* PCR performed at the NH PHL (turn-around-time: within 12-24 hours of specimen receipt)
  - Confirmatory monkeypox virus testing at CDC (turn-around-time: same day specimen is received at CDC)
- Contact tracing once *Orthopoxvirus* infection is confirmed
- Public health “monitoring” of contacts (no quarantine)
- Medical countermeasures (MCMs)
  - Vaccination to prevent monkeypox (PEP) using Jynneos vaccine
  - Investigational therapeutics to treat monkeypox

# Q&A

# Monthly Healthcare Provider & Public Health Partner Webinar Schedule

- **2<sup>nd</sup> Thursday** of each month from 12:00-1:00 pm
- Webinar/call information (unchanged):
  - Zoom link: <https://nh-dhhs.zoom.us/s/94059287404>
  - Webinar ID: 940 5928 7404
  - Passcode: 353809
  - Telephone: 646-558-8656